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(54) **Real time auction bidding using wireless communication device**

(57) The present invention relates to an on-line auction system (100) supporting wireless network users (108) and wired network users (104, 106) as bidders. The auction system has an auction server (102) that conducts on-line auctions for items by allowing bidders to electronically submit bids, and a proxy server (116) that supports the wireless network users, receives auc-

tion update messages from the auction server, and stores auction information pertaining to the on-line auctions for which the wireless network users are participating. The wireless network users can access the stored auction information, can be alerted when a prior bid has been out-bid, and can increase the bid.

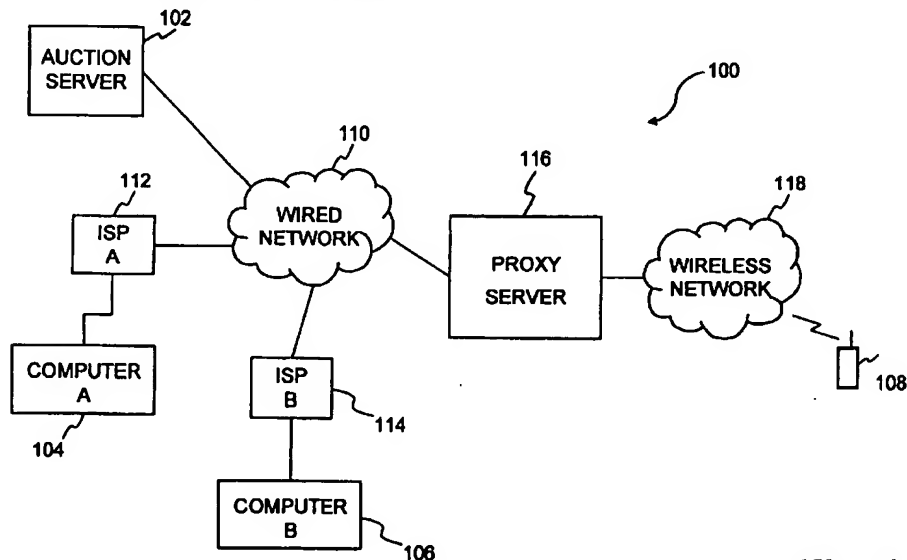


Fig. 1

Description

1. Field of the Invention

[0001] The present invention generally relates to electronic commerce and, more particularly, to on-line auctions from anywhere at anytime.

2. Description of the Related Art

[0002] Recently, auctions have been made available on the Internet. These auctions are carried out by auction websites. Examples of current auction websites include eBay Inc. (<http://www.ebay.com>) and Onsale, Inc. (<http://www.onsale.com>). These auction websites enable sellers to auction off a wide range of products or services. Bidders from anywhere in the world connected to the Internet merely need to access an auction website to submit bids.

[0003] Encouraging participation in auctions is important because the more participation the more the prices tend to be bid up as the auctions proceed. The auction websites also benefit from the higher prices because the auction websites typically receive a percentage of the selling price. Currently, both proxy bidding on your behalf by auction websites and out-bid electronic mail (email) notifications are used to encourage user participation.

[0004] The eBay auction website allows proxy bidding in which a bidder authorizes the eBay auctioneer (i.e., eBay auction server) to automatically increase a bidder's bid in predetermined increments up to a maximum bid amount if any of the bidder's lower bids are out bid by another. One disadvantage of proxy bidding by the auction website on one's behalf is that many bidders are reluctant to permit proxy bidding or, if permitted, tend to keep the maximum bid relatively low because they believe that the automated proxy bidding results in a higher final sales price. Instead, these bidders believe that they can yield a lower sales price by monitoring the bidding process and manually increasing one's bid as needed. However, it is not easy to always monitor the bidding process, particularly when the bidder is not stationed at their desktop computer having a network connection to the Internet or when the bidder is mobile and using a laptop computer that is often not connectable to the Internet. Further, laptop computers are also often either not able to connect to the Internet or not able to interact with the auction websites if Internet access is not available.

[0005] Both eBay and On-Sale, Inc. provide email messages to bidders (potential buyers) when their last bid has been out-bid by another (as referred to as out-bid email notifications). These email messages are supposed to encourage the bidders to increase their bid for the particular product or service. One particular disadvantage with such emails is that the emails are often not able to be timely delivered to recipient bidders. For

example, often a bidder is not stationed at their desktop computer for significant periods of time. As another example, bidders that use laptop computers often have their laptop computers powered-off or not connected to the Internet (which typically requires laptop computers to be within a range of a wireless carrier or to have a telephone line available). Even if the emails are managed to be delivered timely, a bidder would have to have an immediate access to a computer coupled to the Internet to update his/her maximum bid if the bidder still desires the product or server, which is not often feasible to bidders on the go. In such cases, the bidders are not able to monitor the bidding process. As a result, bidder participation suffers because bidders are often unaware that they were out-bid by another bidder and unable to increase their bids in a timely manner.

[0006] Thus, there is a need for improved techniques to increase participation in on-line auctions from anywhere at anytime.

SUMMARY OF THE INVENTION

[0007] Broadly speaking, the invention relates to techniques that provide for increased participation in on-line auctions. One aspect of the invention allows users of mobile devices to actively participate in on-line auctions from anywhere at anytime. Another aspect of the invention allows for remote proxy bidding controlled by bidders themselves (or agents independent of an auction server) and in real time.

[0008] The invention can be implemented in numerous ways, including as a method, an apparatus, a device, a computer readable medium, and a computer system. Several embodiments of the invention are discussed below.

[0009] As a method for increasing a bid for an item being auctioned at an on-line auction using a mobile computing device, one embodiment of the invention includes the acts of: receiving a notification from a wireless network at the mobile computing device that a prior bid by a particular bidder has been out-bid; obtaining auction information pertaining to the item being auctioned; and displaying the auction information on a display screen of the mobile computing device. Additionally, the method may further include the acts of receiving an increased bid for the item being auctioned; and sending the increased bid via the wireless network to the on-line auction.

[0010] As a method for participating in an on-line auction using a mobile device having a display screen, one embodiment of the invention includes the acts of: receiving an auction message pertaining to the on-line auction at the mobile device; notifying a user of the mobile device of the receipt of the auction message; determining whether the user of the mobile device requests auction information pertaining to the auction message; displaying the auction information on the display device when the determining has determined that

the auction information has been requested; and submitting a bid with respect to the on-line auction.

[0011] As a method for automatically increasing a bid for an item being auctioned at an on-line auction, one embodiment of the invention includes the acts of: receiving, at an intermediate server, an auction update message pertaining to the on-line auction of the item, the intermediate server operating as a gateway between a mobile computing device and an auction server that performs the on-line auction; obtaining, at the intermediate server, proxy bidding information pertaining to the mobile computing device and the on-line auction of the item; automatically preparing an increased bid for the item being auctioned based on the auction proxy information, the increased bid being prepared on behalf of the mobile computing device; and sending the increased bid to the on-line auction.

[0012] As an on-line auction system supporting wireless network users and wired network users as bidders, one embodiment of the invention includes: an auction server that conducts on-line auctions for items by allowing bidders to electronically submit bids; and a proxy server that supports the wireless network users. The proxy server receives auction update messages from the auction server and stores auction information pertaining to the on-line auctions for which the wireless network users are participating, and the proxy server thereafter permits the wireless network users to access the stored auction information.

[0013] As a computer readable medium including computer program code for increasing a bid for an item being auctioned at an on-line auction using a mobile computing device, one embodiment of the invention includes: computer program code for receiving a notification at the mobile computing device that a prior bid by a particular bidder has been out-bid; computer program code for obtaining auction information pertaining to the item being auctioned; computer program code for displaying the auction information on a display screen of the mobile computing device; computer program code for determining an increased bid for the item being auctioned; and computer program code for sending the increased bid to the on-line auction.

[0014] As a computer readable medium for participating in an on-line auction using a mobile device having a display screen, one embodiment of the invention includes: computer program code for receiving an auction message pertaining to the on-line auction at the mobile device; computer program code for notifying a user of the mobile device of the receipt of the auction message; computer program code for determining whether the user of the mobile device requests auction information pertaining to the auction message; computer program code for displaying the auction information on the display device when the computer program code for determining has determined that the auction information has been requested; and computer program code for submitting a bid with respect to the on-line auc-

tion.

[0015] As a computer readable medium for automatically increasing a bid for an item being auctioned at an on-line auction, one embodiment of the invention includes: computer program code for receiving, at an intermediate server, an auction update message pertaining to the on-line auction of the item, the intermediate server operating as a gateway between a mobile computing device and an auction server that performs the on-line auction; computer program code for obtaining, at the intermediate server, proxy bidding information pertaining to the mobile computing device and the on-line auction of the item; computer program code for automatically preparing an increased bid for the item being auctioned based on the auction proxy information, the increased bid being prepared on behalf of the mobile computing device; and computer program code for sending the increased bid to the on-line auction.

[0016] The advantages of the invention are numerous. Different embodiments or implementations may yield one or more of the following advantages. One advantage of the invention is that bidders can keep better apprised of the bidding process. Another advantage of the invention is that mobile bidders can easily increase their bids as desired. Still another potential advantage of the invention is that sellers and auctioneers benefit from increased participation and perhaps greater sales prices.

[0017] Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG. 1 is a block diagram of an on-line auction system according to one embodiment of the invention; FIG. 2 is a flow diagram of client bid increase processing according to one embodiment of the invention; FIG. 3 is a flow diagram of server message delivery processing according to one embodiment of the invention; and FIG. 4 is a flow diagram of server bid increase processing according to one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The invention relates to techniques that provide for increased participation in on-line auctions. One aspect of the invention allows users of mobile devices to

actively participate in on-line auctions from anywhere at anytime. Another aspect of the invention allows for remote proxy bidding controlled by bidders themselves and in real time from anywhere at anytime.

[0020] Today, various types of mobile devices capable of data communications are commonly used. Examples of the mobile devices include pagers, mobile phones (including cellular phones), personal digital assistants (PDAs), palm-top computers and electronic schedulers. Due to size and mobility requirements, mobile devices typically have substantially less computing resources than a desktop or laptop computer does. The mobile devices also typically have a small display screen and a limited input mechanism (e.g., keyboard, buttons, a phone keypad, or active soft keys and icons) for a user to interact with. Embodiments of the invention are discussed below with reference to FIGs. 1-4. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

[0021] FIG. 1 is a block diagram of an on-line auction system 100 according to one embodiment of the invention. The on-line auction system 100 includes an auction server 102 that conducts one or more auctions for the purchase of one or more products or services.

[0022] The on-line auction system 100 enables computing devices of both wired and wireless types to participate in the one or more auctions being managed by the auction server 102. In particular, the on-line auction system 100 illustrated in FIG. 1 includes a computer A 104 and a computer B 106 at which users are able to participate in the on-line auctions. In addition, a wireless mobile device 108 is also included in the on-line auction system 100 and represents a wireless station at which a user can participate in the on-line auctions. Although FIG. 1 illustrates only three devices 104, 106 and 108, it should be understood that the on-line auction system 100 can support a large number of computing devices or users thereof.

[0023] The auction server 102 couples to a wired network 110, typically through a high-speed connection. The wired network 110 is preferably the Internet but could also be other networks such as an Intranet, Local Area Network (LAN) or wide area network (WAN). Additionally, Internet Service Providers (ISP) A 112 and ISP B 114 also couple to the wired network 110 through high speed connections. Examples of the high-speed connections include leased lines (e.g., T1 - T4 lines). The computer A 104 couples to the ISP A 112 through a link, which may be a dial-up connection over a telephone line or a dedicated line. The computer B 106 also couples to the ISP B 114, typically through a dial-up connection over a telephone line or a dedicated line. The links between the computers 104 and 106 and the ISPs 112 and 114, respectively, are initiated by network browsers operating on the respective computers 104 and 106.

[0024] The on-line-auction system 100 also

includes a proxy server 116 that serves as a gateway between the wired network 110 and a wireless network 118. The wired network 110 couples to the proxy server 116 through a high-speed connection, and the proxy server 116 couples to the wireless network 118 through a wireless infrastructure that enables the transmission and reception of radio frequency signals with the wireless communication device 108 such that data can be transmitted between the wireless network 118 and the wireless communication device 108. Examples of the wireless network 118 may include Cellular Digital Packet Data (CDPD), Global System for Mobile Communications (GSM), Code Division Multiple Access (CDMA) and Time Division Multiple Access (TDMA), to name a few.

[0025] The auction server 102 operates to manage one or more auctions for the purchase of one or more products or services. During a live on-line auction, users are able to bid for products or services by use of a network browser operating on the computer A 104, the computer B 106, or the wireless computing device 108. With respect to a user at the computer A 104 or at the computer B 106, through the network browser, the user would access the auction server 102 to identify a particular product or service on which he/she desires to bid. The user is then able to submit a bid to the auction server 102 through use of the network browser. Examples of the network browser suitable for use on the computer A 104 and the computer B 106 include Netscape Navigator from Netscape Communications, Inc. or Microsoft Explorer from Microsoft Corporation.

[0026] Additionally, the user of the mobile device 108 can participate in the on-line auction even though the mobile device 108 is mobile and often not powered-on or in use. In one embodiment, the proxy server 116 is able to manage the interaction with the auction server 102 for the user of the mobile device 108. As such, the auction server 102 can treat the users of the mobile device 108 in the same manner as the users of the computers 104 and 106 (wired computing devices) are treated. In one embodiment, a micro network browser operates on the mobile device 108 to enable a user to access the auction server 102 for identifying a particular product or service and for submitting a bid. One suitable micro network browser is a micro-browser available from Unwired Planet, Inc. of Redwood City, CA. The micro-browser allows the user of a mobile device, like users of the wired devices, to interact with directly or indirectly with auction server 102 but, as described below, provides numerous advantages and benefits that are generally not available to the users of the wired devices. Additional details on the operation of the proxy server 116 are provided below with respect to FIGs. 3 and 4.

[0027] Once the auction server 102 receives a user's bid, the bid is processed in accordance with the auction rules. Initially, the incoming bid must be associated with the auctioning of a particular item (i.e., product

or services). Then, the incoming bid is processed with respect to the associated auction. Usually, the processing of the incoming bid involves comparing the incoming bid a current high bid and establishing the incoming bid as a new current high bid when the incoming bid exceeds the current high bid. The bids are also typically time-stamped so that they are considered in the order received. In some auctions, the bidder knows the current high bid and is thus able to become the new current high bidder unless another bidder bids higher beforehand.

[0028] Typically, the auction server 102 desires to notify those bidders who have previously submitted bids that have been outbid by another subsequent bidder. Such notifications are typically provided to the prior bidders through an electronic mail message. For example, if a user at the computer A 104 has submitted a bid to the auction server 102 that is subsequently outbid by a bid submitted by a user at the computer B 106, then the auction server 102 would send an electronic mail message to the computer A 104 (destined for the user of the computer A 104) informing the user that another bidder has outbid him/her. At this point, the user of the computer A 104 would be offered the ability to submit an increased bid to outbid that bid provided by the user of the computer B 106. One of the problems with the example is that both of the users must constantly have access to the computers otherwise the users may unintentionally lose a bidding opportunity. The invention enables such notifications to be provided to users of mobile devices. With dedicated applications embedded in the mobile device, the users can monitor and participate in the auction in near real-time from anywhere at anytime.

[0029] The notifications are typically expressed in a format of a markup language that may be Handheld Device Markup Language (HDML), Hypertext Markup Language (HTML), compact HTML, Wireless Markup Language (WML) and Extensible Markup Language (XML), or optionally in a compressed, converted or distilled version thereof. When a notification is received, it is caused to be displayed on a screen of a mobile device if powered on so that a user may see the status of his/her bidding and decide what to proceed with next. If the mobile device is powered off or beyond service coverage, such notifications are typically buffered in the proxy server 116 and delivered once the mobile device becomes available for the delivery. Additionally the notifications may comprises an alert that can cause the mobile device to react accordingly upon being received. The common alert types for the notifications can vary widely. As examples, the alert types can cause the mobile device to produce a sequence of high pitch sounds, vibrate the mobile device, or produce flashing message so that a user of the device immediately becomes aware of the arrival of notifications from an auction server.

[0030] FIG. 2 is a flow diagram of client bid increase

processing 200 according to one embodiment of the invention. The client bid increase processing 200 enables a mobile device to participate in an auction by receiving notifications and submit an increased bid if desired. The client bid increase processing 200 is, for example, performed with respect to the mobile device 108 illustrated in FIG. 1.

[0031] The client bid increase processing 200 initially begins with a decision 202 determines whether a notification has been received. Until a notification has been received, the client bid increase processing 200 is effectively inactive. Once the decision 202 determines that a notification has been received, the client bid increase processing 200 is effectively invoked.

[0032] Once invoked, a user is notified 204 of the notification. Depending on the particular mobile device and the alert type in the notification, the user can be notified in a variety of ways. Typically, the mobile computing device having a small display screen displays a notification for the user. The notification can simply indicate that there is new auction information or provide more particular information about the auction. As an example, when the auction server provides email notifications, the mobile computing device can display the sender and subject of the notification message in an email in box provided on the mobile computing device.

[0033] Next, a decision 206 determines whether detailed auction information is requested. Sometimes, a notification provides a hyperlink to a resource that comprises detailed auction information and the user decides whether and when to retrieve or request the auction information. In the above example, the email body can be retrieved according to a linkage provided in the email header including the sender and subject of the notification message. The user is able to obtain the auction information by any of a variety of means, for example, through an email to the mobile device/a fax machine/a wired device by depressing a predefined button (or soft button) on the mobile computing device or activating a graphical icon being displayed.

[0034] When the decision 206 determines that the auction information has not been requested, a decision 208 determines whether a request to quit the client bid increase processing 200 has been received. When the decision 208 determines that a request to quit has been received, the client bid increase processing 200 is complete and ends. On the other hand, when the decision 208 determines that a request to quit has not been received, then the client bid increase processing 200 returns to repeat the decision 206.

[0035] Alternatively, when the decision 206 determines that the auction information request has been received, the auction information pertaining to the notification is retrieved 210 (from a proxy server or an auction server depending on an actual implementation preference). The auction information is originally supplied from the auction server, such as the auction server 102 illustrated in FIG. 2, and to the mobile computing

device through a proxy server (or gateway server). The proxy server needs only temporarily to store the auction information being passed on from the auction server to the mobile computing device. However, for increased performance and monitoring, the proxy server can further operate to store information pertaining to the auction for use by the mobile device. This would allow the proxy server to provide enhanced auction features not offered by the auction server or more controlled features even if offered by the auction server. An example of a more controlled feature is proxy bidding managed by the proxy server. The information pertaining to the auction can be "push" or "pulled" to/from the auction server to the proxy server at predetermined times or otherwise. Examples of the information that might be stored at the proxy server, include an auction website identifier, a user identifier for the bidder, a password, an item number for the items being bid on, last bid, a remote proxy bid enable flag, current bid, bid history, remaining bid time.

[0036] In any case, once the auction information is retrieved 210 and thus provided to the mobile device, the auction information that has been retrieved is displayed 212. In this embodiment, the mobile device 108 includes a display screen on which the auction information can be displayed. In one embodiment, the auction information is provided in a markup language, such as HTML, HDML or WML, and displayed on the display screen using a network browser operating on the mobile device. In one embodiment, the auction information is displayed together with a bid increase form that enables a user of the client device to submit an increased bid for the particular auction. In another embodiment, the bid increase form is a separate screen (or document in the markup language).

[0037] In any case, thereafter, a decision 214 determines whether the bid increase form has been submitted. The submission of a form to a server is achieved through use of the network browser when the form is a markup language document displayed by the network browser. A user of the mobile device can complete the form and cause the bid increase form to be submitted using one or more buttons (or soft buttons) on the mobile device.

[0038] When the bid increase form has not yet been submitted, a decision 218 determines whether a quit request has been made. When the decision 218 determines that a request to quit has not yet been received, the client bid increase processing 200 returns to repeat the decision 214 to again determine whether the bid increase form has been submitted. On the other hand, when the decision 218 determines that a request to quit has been received, the client bid increase processing 200 is complete and ends.

[0039] Alternatively, when the decision 214 determines that the bid increase form has been submitted, the bid increase information pertaining to the bid increase form is sent 216 to an auction manager. With

respect to the on-line auction system 100 illustrated in FIG. 1, the bid increase information is sent to the auction server 102 by the proxy server 116. The proxy server can also store the bid increase information in case the proxy server performs additional management to provide enhanced auction features not offered by the auction server or more controlled features even if offered by the auction server. After the bid increase information is sent 216, the client bid increase processing 200 is complete and ends.

[0040] FIG. 3 is a flow diagram of server message delivery processing 300 according to one embodiment of the invention. The server message delivery processing 300 is, for example, performed by the proxy server 116 illustrated in FIG. 1.

[0041] The server message delivery processing 300 begins with a decision 302 as to whether an auction update message has been received. Here, the auction update message would be received from an auction server, such as the auction server 102 illustrated in FIG. 1. If an auction update message has not yet been received, the server message delivery processing 300 simply awaits the reception of an auction update message.

[0042] Once the decision 302 determines that an auction update message has been received, a decision 304 determines whether a proxy bid is enabled. As an example, in one embodiment, the decision 304 can make use of the remote proxy bid enable flag stored by the proxy server. When the decision 304 determines that a proxy bid is not enabled, then the auction update message for the wireless computing device is reformatted 306. In one embodiment, the auction update message that has been received is in a standard Internet email protocol, such as Simple Message Transport Protocol (SMTP), and then reformatted into a format more suitable for the mobile device, such as HDML or WML, for example. In another embodiment, the auction update message could be received in a HTML format and then converted to HDML or WML.

[0043] Next, the reformatted auction update message is placed 308 in a message delivery queue. From the message delivery queue, the reformatted auction update message is, thereafter, distributed or forwarded to the wireless computing device as are other electronic messages destined for the wireless computing device. Following the placement 308 of the reformatted auction update message in the message delivery queue, the server message delivery processing 300 is complete and ends.

[0044] Alternatively, when the decision 304 determines that a proxy bid is enabled, the server message delivery processing 300 operates differently to allow for a proxy bid to occur without user interaction. In other words, the proxy server, e.g., the proxy server 116, performing the server message delivery processing 300 is able to submit an increased bid to the ongoing auction on behalf of the user of the mobile device. In particular,

a bid increase reply message is prepared 310 based on proxy bidding information. As an example, the proxy bidding information can be pre-stored on the proxy server or made available to the proxy server and can contain information such as a bidding increment, a maximum bid, and a timing for the bidding. After the bid increase reply message is prepared 310, the bid increase reply message is sent 312 to the auction manager (or auction server). After sending the bid increase reply message, the server message delivery processing 300 is complete and ends. In the case in which the server is not performing a proxy bid on behalf of the mobile computing device, the user of the mobile computing device can submit a bid increase form as the discussed above with respect to FIG. 2. It should be also noted that even with proxy bidding enabled, the server can also provide auction update information to the mobile computing device such as to inform a user of the mobile computing device that of the auction status or a bid increase. It should also be noted that other embodiments of the server message delivery processing need not to provide any proxy bidding.

[0045] FIG. 4 is a flow diagram of server bid increase processing 400 according to one embodiment of the invention. The server bid increase processing 400 concerns the processing performed by the server, e.g., the proxy server 116, when a user of the mobile device has submitted a bid increase form to increase their bid with respect to an on-line auction. The bid increase processing 400 explains how the server processes the bid increase form.

[0046] The server bid increase processing 400 begins with a decision 402 that determines whether a bid increase form has been received. If a bid increase form has not yet been received, the server bid increase processing 400 awaits the reception of such a bid increase form. Once the decision 402 determines that a bid increase form has been received, the bid increase form is associated 404 with an auction update message. Here, the auction update message was previously received by the proxy server and used to present auction information to the user of the mobile device. Next, a bid increase reply message is prepared 406 based on the auction update message and the bid increase form. Then, the bid increase reply message is sent 408 to the auction manager. After the bid increase reply message is sent 408, the server bid increase processing 400 is complete and ends. In one embodiment, the bid increase reply message is structured in a manner such that it has a format the same as would a reply message to the auction update message. As such, in such an embodiment, the bid increase reply message would look to the auction manager like any other reply messages (to increase bids) that would be received from a user of a computer (e.g., computers 104 and 106) interacting with the auction server through a wired network using electronic mail.

[0047] The invention can also be embodied as com-

puter readable code on a computer readable medium. The computer readable medium is any data storage device that can store data which can be thereafter be read by a computer system. Examples of the computer readable medium include read-only memory, random-access memory, CD-ROMs, magnetic tape, optical data storage devices, carrier waves. The computer readable medium can also be distributed over a network coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

[0048] The advantages of the invention are numerous. Different embodiments or implementations may yield one or more of the following advantages. One advantage of the invention is that bidders can keep better apprised of the bidding process. Another advantage of the invention is that mobile bidders can easily increase their bids as desired. Still another potential advantage of the invention is that sellers and auctioneers benefit from increased participation and perhaps greater sales prices.

[0049] The many features and advantages of the present invention are apparent from the written description, and thus, it is intended by the appended claims to cover all such features and advantages of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation as illustrated and described. Hence, all suitable modifications and equivalents may be resorted to as falling within the scope of the invention.

Claims

1. A method for increasing a bid for an item being auctioned at an on-line auction using a mobile telephone, said method comprising:-

- (a) receiving a notification from a wireless network at the mobile telephone that a prior bid by a particular bidder has been out-bid;
- (b) obtaining auction information pertaining to the item being auctioned; and
- (c) displaying the auction information on a display screen of the mobile telephone.

2. A method as recited in claim 1, said method further comprising:-

- (d) receiving an increased bid for the item being auctioned if the particular bidder determines to place the increased bid; and
- (e) sending the increased bid to the on-line auction via the wireless network.

3. A method as recited in claim 2, wherein said receiving step (d) comprises:

- (d1) displaying a bid increase form on the dis-

- play screen of the mobile device; and
(d2) forming the increased bid after the particular bidder completes the bid increase form on the display screen.
4. A method as recited in any preceding claim wherein the auction information is obtained from a proxy server supporting the mobile computing device and coupled to an auction server performing the on-line auction.
 5. A method as recited in any preceding claim wherein the mobile telephone executes a micro-browser for providing at least said obtaining step (b) and said displaying step (c).
 6. A method for participating in an on-line auction using a mobile device having a display screen, said method comprising:
 - (a) receiving an auction message pertaining to the on-line auction at the mobile device; wherein the auction message comprises an alert type;
 - (b) notifying a user of the mobile device of the receipt of the auction message according to said alert type;
 - (c) determining whether the user of the mobile device requests auction information pertaining to the auction message;
 - (d) displaying the auction information on the display screen when said determining step (c) has determined that the auction information has been requested; and
 - (e) submitting a bid with respect to the on-line auction.
 7. A method for automatically increasing a bid for an item being auctioned at an on-line auction, said method comprising:-
 - (a) receiving, at an intermediate server, an auction update message pertaining to the on-line auction of the item, the intermediate server operating as a gateway between a mobile device and an auction server that performs the on-line auction;
 - (b) obtaining, at the intermediate server, auction proxy bidding information pertaining to the mobile device and the on-line auction of the item;
 - (c) automatically preparing an increased bid for the item being auctioned based on the auction proxy bidding information, the increased bid being prepared on behalf of the mobile device; and
 - (d) sending the increased bid to the on-line auction.
 8. An on-line auction system supporting wireless network users and wired network users as bidders, said on-line auction system comprising:-
 - an auction server that conducts on-line auctions for items by allowing bidders to electronically submit bids; and
 - a proxy server that supports the wireless network users;
 - wherein said proxy server receives auction update messages from said auction server and stores auction information pertaining to the on-line auctions for which the wireless network users are participating, and said proxy server thereafter permits the wireless network users to access the stored auction information.
 9. An on-line auction system as recited in claim 8 wherein said proxy server forwards the auction update messages to the appropriate wireless network users
 10. An on-line auction system as recited in claim 8 or 9 wherein said proxy server reformats the auction update messages before forwarding them to the appropriate wireless network users.
 11. A computer readable medium including computer program code for increasing a bid for an item being auctioned at an on-line auction using a mobile device, said computer readable medium comprising:-
 - computer program code for receiving a notification at the mobile device that a prior bid by a particular bidder has been out-bid;
 - computer program code for obtaining auction information pertaining to the item being auctioned;
 - computer program code for displaying the auction information on a display screen of the mobile device;
 - computer program code for determining an increased bid for the item being auctioned; and
 - computer program code for sending the increased bid to the on-line auction.
 12. A computer readable medium for participating in an on-line auction using a mobile device having a display screen, said computer readable medium comprising:-
 - computer program code for receiving an auction message pertaining to the on-line auction at the mobile device;
 - computer program code for notifying a user of the mobile device of the receipt of the auction message;

computer program code for determining whether the user of the mobile device requests auction information pertaining to the auction message;

computer program code for displaying the auction information on the display device when said computer program code for determining has determined that the auction information has been requested; and
computer program code for submitting a bid with respect to the on-line auction.

13. A computer readable medium for automatically increasing a bid for an item being auctioned at an on-line auction, said computer readable medium comprising:-

computer program code for receiving, at an intermediate server, an auction update message pertaining to the on-line auction of the item, the intermediate server operating as a gateway between a mobile device and an auction server that performs the on-line auction;
computer program code for obtaining, at the intermediate server, proxy bidding information pertaining to the mobile device and the on-line auction of the item;
computer program code for automatically preparing an increased bid for the item being auctioned based on the auction proxy information, the increased bid being prepared on behalf of the mobile device; and
computer program code for sending the increased bid to the on-line auction.

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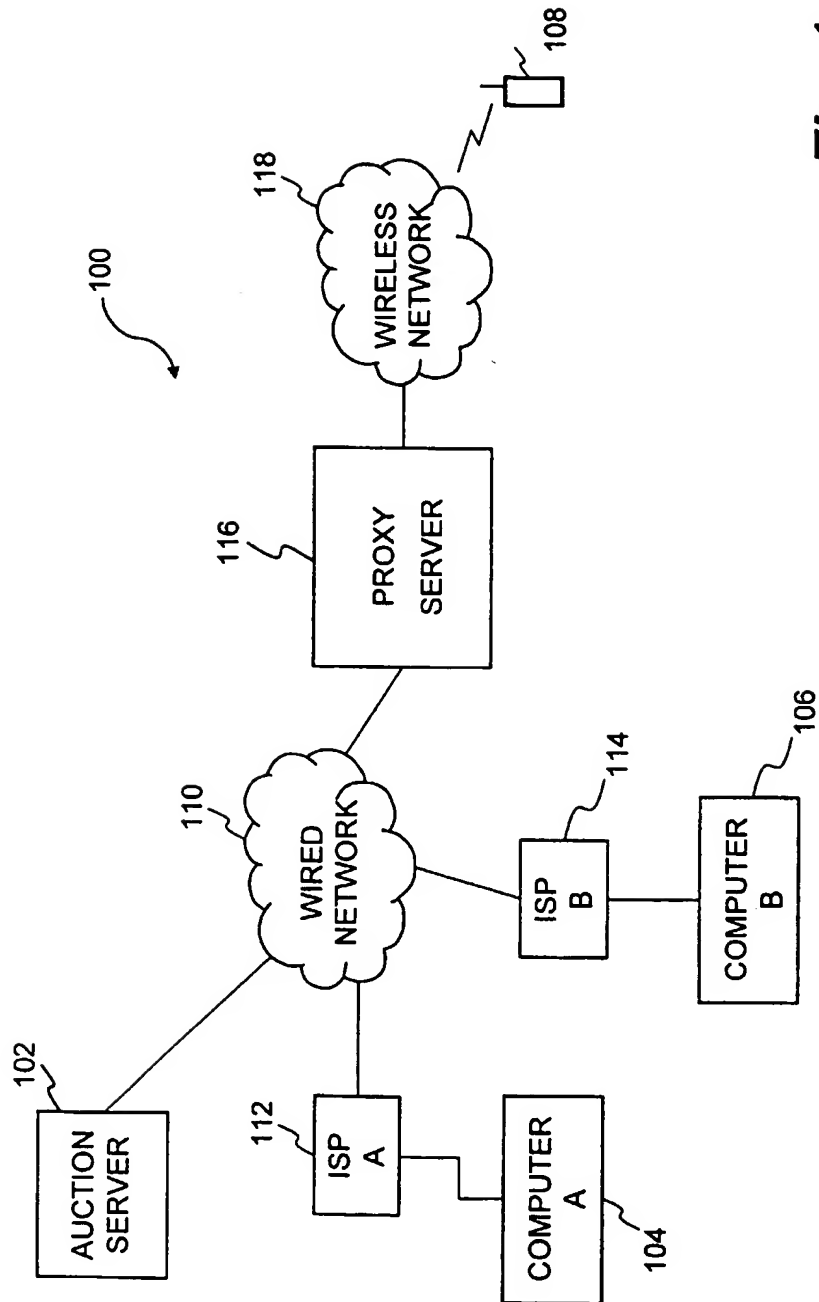
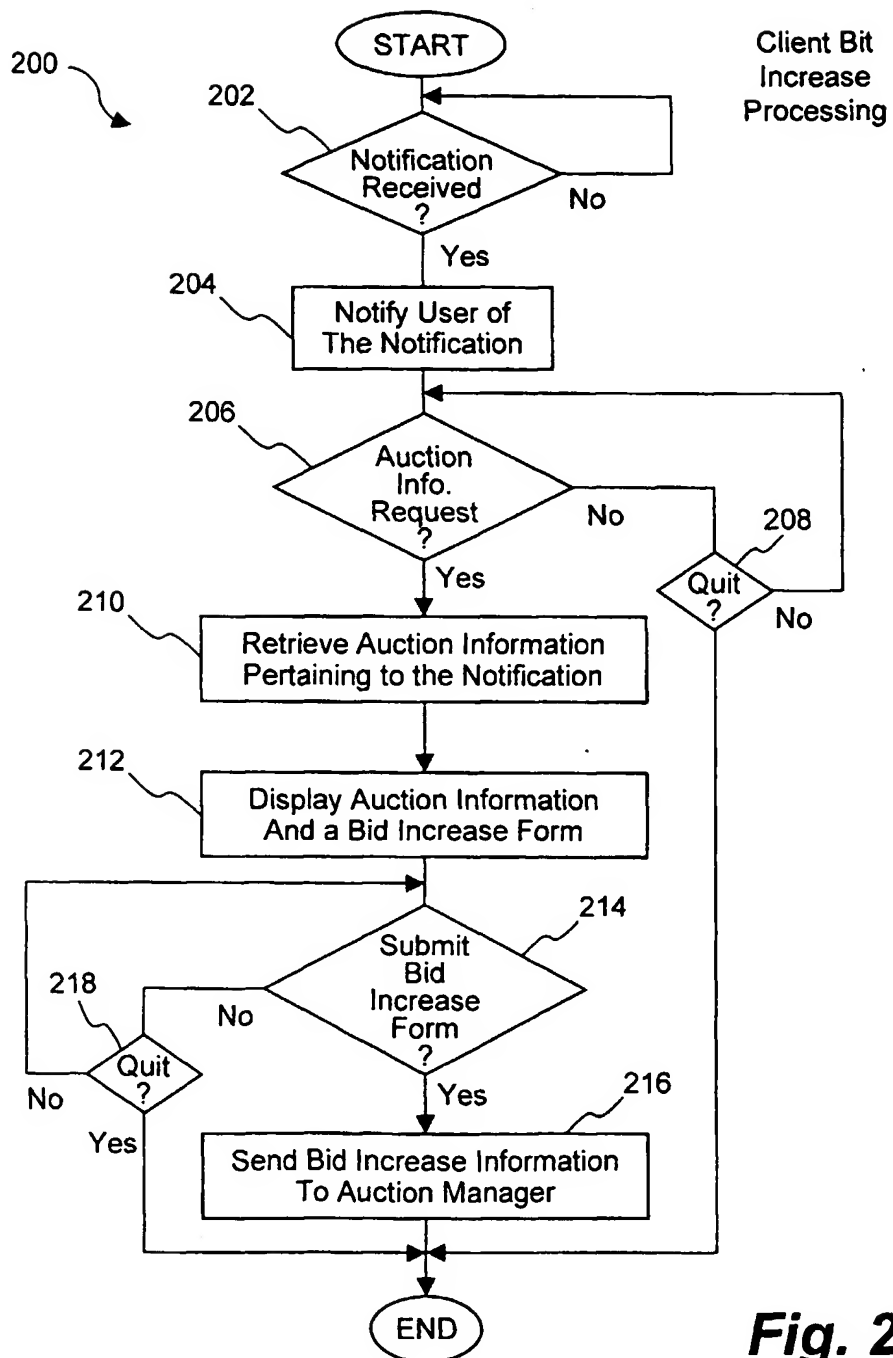
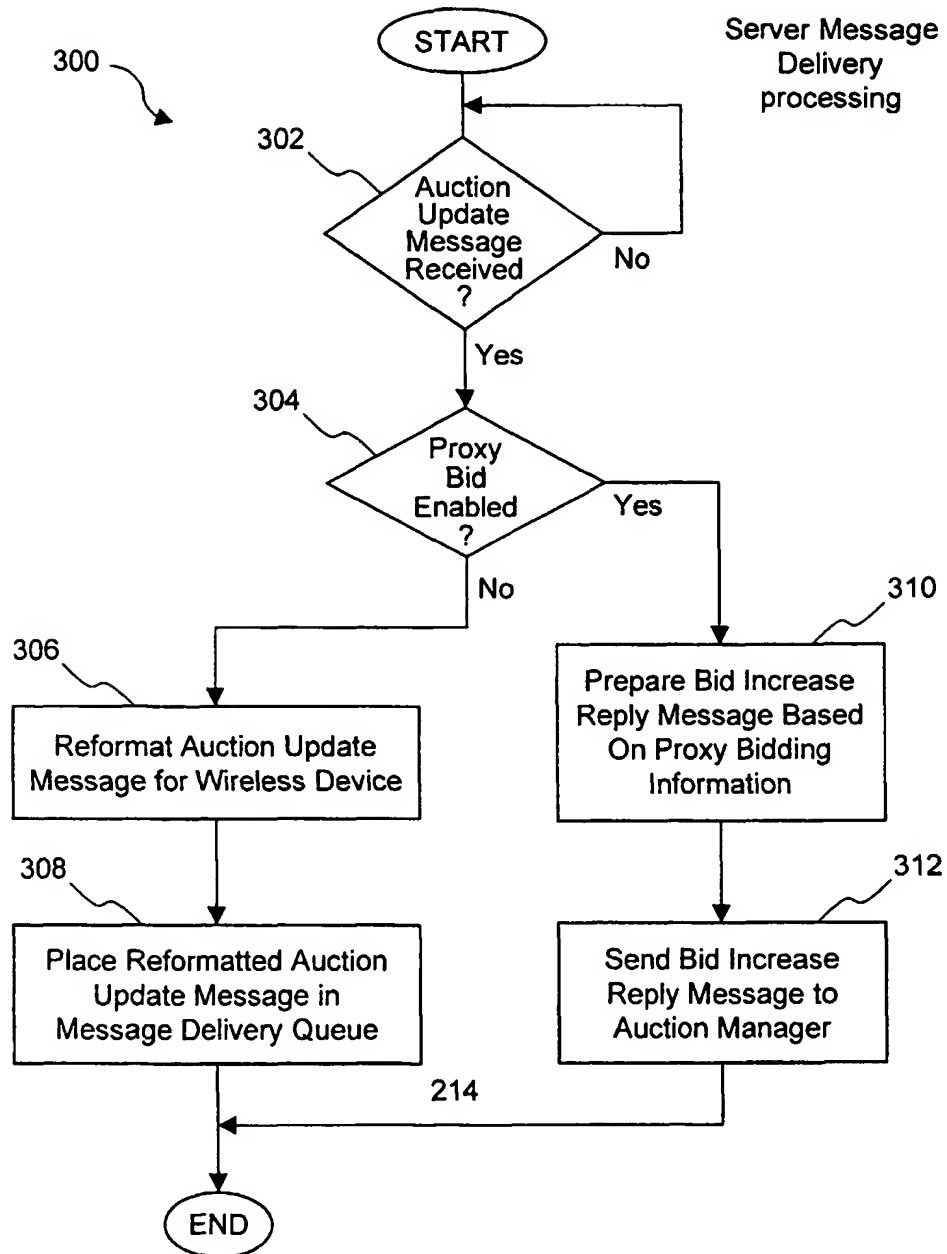
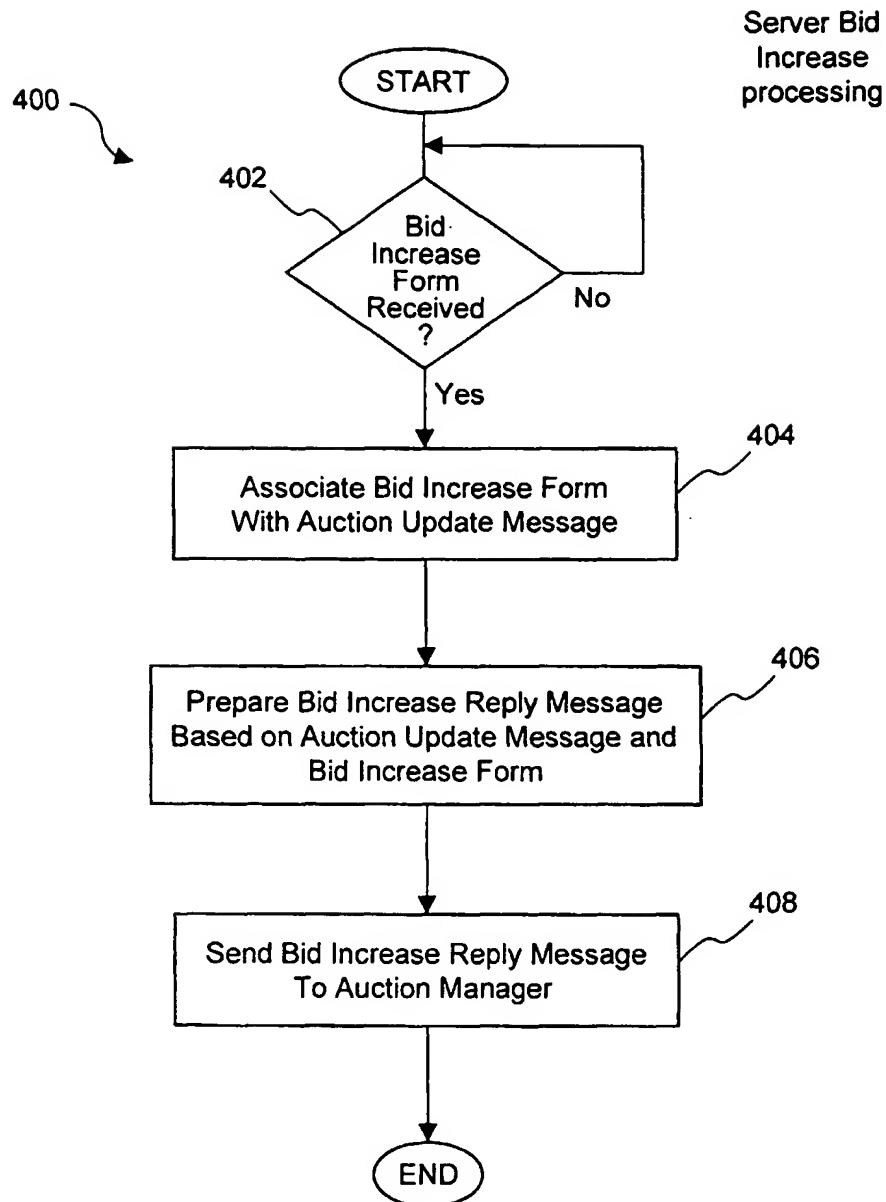


Fig. 1



**Fig. 3**

**Fig. 4**